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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/006,704	12/10/2001	Shane J. Trapp	M4065.0369/P369-A	3229
24998	7590	05/19/2004	EXAMINER	
DICKSTEIN SHAPIRO MORIN & OSHINSKY LLP			UMEZ ERONINI, LYNETTE T	
2101 L STREET NW			ART UNIT	
WASHINGTON, DC 20037-1526			PAPER NUMBER	

1765

DATE MAILED: 05/19/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

<b>Office Action Summary</b>	Application No.	Applicant(s)	
	10/006,704	TRAPP, SHANE J.	
	Examiner	Art Unit	
	Lynette T. Umez-Eronini	1765	

**-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --**

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 27 February 2004.
- 2a) ☒ This action is **FINAL**.                      2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 26-76 is/are pending in the application.
- 4a) Of the above claim(s) 33, 36-70 and 73-76 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 26-32, 34, 35, 71, and 72 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |   |   |
|---|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)                        | 4) <input type="checkbox"/> Interview Summary (PTO-413)                     |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)    | Paper No(s)/Mail Date. _____  |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| Paper No(s)/Mail Date _____   | 6) <input type="checkbox"/> Other: _____                                    |

## DETAILED ACTION

### ***Rejections - 35 USC § 102***

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

2. Claims 26-30, 32, 34, and 35 are rejected under 35 U.S.C. 102(b) as being anticipated by Hamrah et al. (EP 0 553961 A2).

Hamrah teaches a reactive ion etch process for etching oxide (insulative) layers by using a standard oxide etch chemistry that include  $\text{CHF}_3$ , Ar, and  $\text{CF}_4$  (page 2, lines 1-5, 16-18), adding a gaseous source of hydrogen radical, such as ammonia to the oxide RIE etching chemistries (page 2, lines 32-34), and supplying a selected reactive gas mixture including a gaseous source of hydrogen radicals and RF are supplied to the chamber to establish an etching plasma (page 2, lines 44-46). The aforementioned reads on,

A composition suitable for use in etching an insulative layer formed over a substrate in a semiconductor device, said composition comprising:

a flowing plasma etchant mixture consisting essentially of at least one fluorocarbon and ammonia, wherein said ammonia. Hamrah shows in Example 3, the flow rates of fluorocarbons and  $\text{NH}_3$  vary respectively, from 3 to 30 sccm and 4 to 10

sccm (see Table on page 6, lines 4-43). Hence the ratio of the said flow rates of fluorocarbon to ammonia falls within 2:1 to about 40:1, as **in claim 26**.

The above aforementioned further reads on,

wherein said fluorocarbon is at least one member selected from the group consisting of fluorocarbons, **as in claim 27**;

wherein said fluorocarbon is at least one member selected from the group consisting of  $C_4F_8$ ,  $C_4F_6$ ,  $C_5F_8$ ,  $CF_4$ ,  $C_2F_6$ ,  $CHF_3$ , and  $CH_2F_2$ , **in claim 28**; and

wherein said fluorocarbon is at least one member selected from the group consisting of  $CF_4$ ,  $CHF_3$ , and  $CH_2F_2$ , **in claim 29**;

wherein said fluorocarbon is at least two members selected from the group consisting of and is a combination of  $CF_4$ ,  $CHF_3$  and  $CH_2F_2$ , **in claim 30**; and

a flowing plasma etchant mixture comprising at least  $CH_3F$  and ammonia, wherein the flow rate of  $CHF_3$  is from about 37 to 42 sccm (see Table on page 7, lines 12-56), **in claim 72**.

Hamrah teaches the flow rate of 30 sccm  $CHF_3$  and 7 sccm ammonia (page 9, lines 2-5), which reads on, said flow rate ratio is within the range of about 3:1 to about 20:1 and 4:1 to about 10:1, respectively **in claims 34 and 35**.

Since Hamrah uses the same etchants to etch an insulation layer as that of the claimed invention then, using Hamrah's etchants in the same manner as in the claimed invention would result wherein said is ineffective to remove side wall spacers of a gate formed over said substrate, **in claim 32**.

***Claim Rejections - 35 USC § 103***

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

5. Claim 31 is rejected under 35 U.S.C. 103(a) as being unpatentable over Hamrah (EP '961 A2) as applied to claim 26 above, and further in view of Becker et al. (US 6,015,760).

Hamrah differs only in failing to teach wherein said fluorocarbon is a combination of CF<sub>4</sub>, CHF<sub>3</sub> and CH<sub>2</sub>F<sub>2</sub>, in claim 31.

Becker teaches anisotropic etching takes place primarily in the vertical direction so that feature widths substantially match the photoresist pattern widths (column 1, lines 40-43); and anisotropic etching is utilized when feature sizing after etching must be maintained within specific limits so as not to violate alignment tolerances or design rules

(column 1, line 43-46); and selectively etching SiO<sub>2</sub> layer with respect to a nitride layer by using a fluorinated chemical etchant system that comprises: CF<sub>4</sub>, CHF<sub>3</sub> and a CH<sub>2</sub>F<sub>2</sub> additive material (column 4, lines 16-18) and in this way, the etching process provides for the formation of sidewalls in etched layers which have a substantially vertical profile (column 4, lines 29-31).

It is the examiner's position that it would have been obvious to one having ordinary skill in the art at the time of the claim invention to modify Hamrah by combining the etchants as taught by Becker for the purpose of meeting specific limits that would not violate alignment tolerances or design rules (Becker, column 1, lines 43-46).

6. Claim 71 is rejected under 35 U.S.C. 103(a) as being unpatentable over Hamrah (EP '961 A2).

Hamrah teaches a reactive ion etch process for etching oxide (insulative) layers by using a standard oxide etch chemistry that include CHF<sub>3</sub>, Ar, and CF<sub>4</sub> (page 2, lines 1-5, 16-18), adding a gaseous source of hydrogen radical, such as ammonia to the oxide RIE etching chemistries (page 2, lines 32-34), and supplying a selected reactive gas mixture including a gaseous source of hydrogen radicals and RF are supplied to the chamber to establish an etching plasma (page 2, lines 44-46). The aforementioned reads on,

A composition suitable for use in etching an insulative layer formed over a substrate in a semiconductor device, said composition comprising:

a flowing plasma etchant mixture comprising CF<sub>4</sub> and NH<sub>3</sub>.

Hamrah differs in failing to specify the flow rate ratio of  $\text{CF}_4:\text{NH}_3$  is greater than 3:1.

It would have been obvious to one having ordinary skill in the art at the time of that claimed invention to employ any combination of flow-rate ratios of the etchants gases as taught by the Hamrah reference, including those disclosed by applicants because the etchants are seen as equivalent for removing semiconductor materials.

### ***Response to Arguments***

7. Applicant's arguments with respect to claims 26-76 have been considered but are moot in view of the new ground(s) of rejection.

### ***Conclusion***

8. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of

Application/Control Number: 10/006,704  
Art Unit: 1765

Page 7

the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Lynette T. Umez-Eronini at 571-272-1470. The examiner is normally unavailable on the First Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nadine Norton can be reached on 571-272-1465. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

ltue

May 11, 2004

NADINE G. NORTON  
SUPERVISORY EXAMINER

